

ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON, TEXAS

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Friday, August 5, 1977



Orbiter to separate from 747, glide to lakebed landing Aug. 12

Orbiter Enterprise, with Astronauts Fred W. Haise Jr. and C. Gordon Fullerton at the controls, is scheduled to be released from atop its 747 carrier aircraft for the first free approach and landing Aug. 12.

This flight will begin the final phase of Orbiter approach and landing tests at the NASA Dryden Flight Research Center, Edwards, Calif.

Haise, commander, and

Fullerton, pilot, will fly the 75-ton Orbiter to an unpowered landing on a dry lake runway after explosive bolts release the spacecraft from the 747 at an altitude of about 22,100 feet (AGL) or 6736 meters.

Takeoff time for the flight is 10 a.m. (CDT) with separation about 45 minutes later. The gliderlike flight to landing will take about 5 minutes.

Live television coverage of the free flight will be projected on screens in the Bldg. 2 and Bldg. 30 auditoriums beginning about 9:30 a.m. Aug. 12. Separation is expected about 10:45 a.m.

The initial solo flight follows a series of unmanned and manned captive flights which verified the aerodynamic and handling capabilities of the 747/Orbiter combination as well as Orbiter systems and crew procedures.

The first and third manned flights were flown by Haise and Fullerton. The second manned flight was flown by Astronauts Joe H. Engle, commander, and Richard H. Truly, pilot. Engle and Truly will also fly even-numbered free flights.

The flight path of the Orbiter's first solo flight follows a racetrack pattern with separation occurring when the vehicles are about 8 miles (13 km) to the right and flying parallel to the landing runway.

To perform the separation maneuver, the 747 will pitch down to -6 degrees and accelerate to establish equilibrium glide conditions of 270 knots (500 kmh) equivalent air speed (KEAS) and -9.2 degrees flight path angle.

At this point the Orbiter pilot will initiate separation by firing a series of explosive bolts at an altitude of about 22,000 feet (6,705 meters) above runway level.

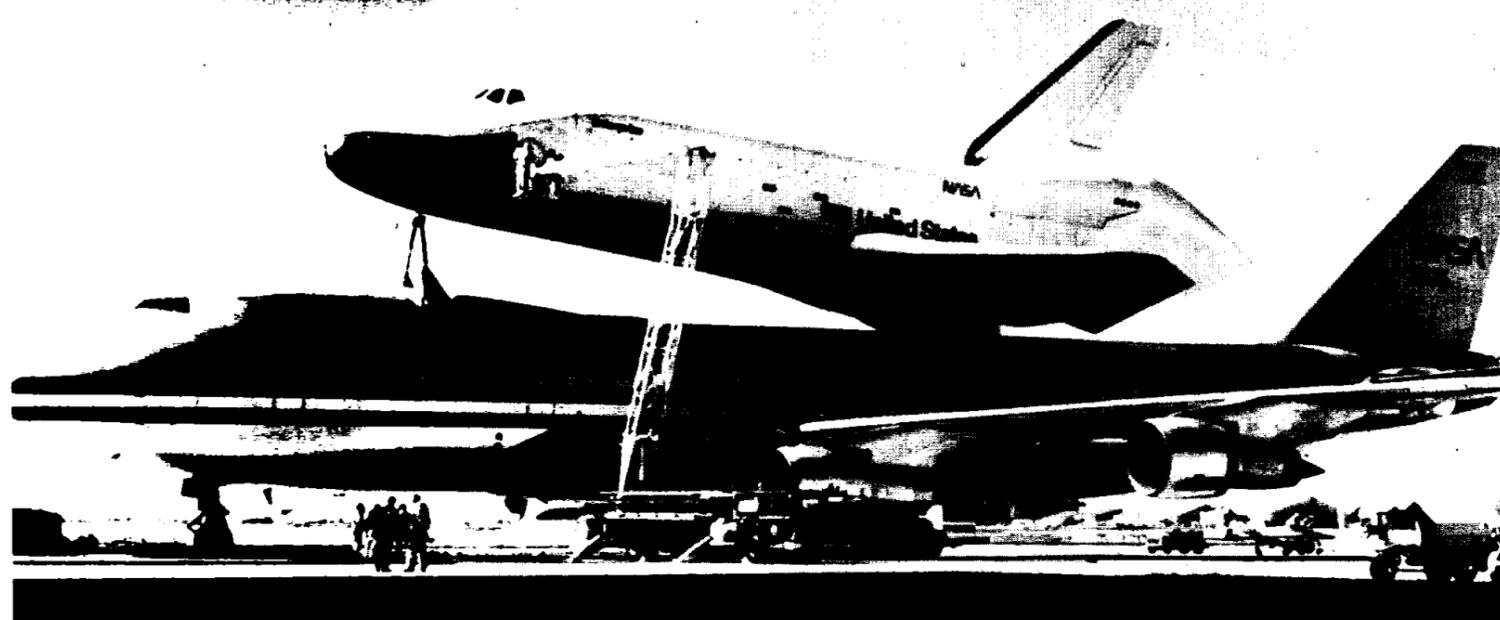
The second free flight is scheduled for 3-4 weeks later.

Langley seeks ex-employees for reunion

NASA's Langley Research Center, Va., will celebrate its 60th anniversary Aug. 24 with a Family Day observance.

Interested former employees of Langley are asked to send in their names and present addresses so that they may be forwarded a program and invitation letter from LRC Director Donald Hearsh.

Send the requested information to Agnes Dunkley, Mail Stop 115, Langley Research Center, Hampton, Va. 23665.



Astronauts Fred Haise, commander, and Gordon Fullerton, pilot, (inset) will take Orbiter on first free flight Aug. 12.

20 astronaut hopefuls arrive for interviews

The first 20 of approximately 200 Space Shuttle astronaut applicants to be selected for individual interviews and physical examinations reported to JSC Tuesday, August 2.

Women and minorities will be among the number chosen for further screening from 8,079 applicants. NASA expects the number to be interviewed at JSC to be about evenly divided between pilot and mission specialist applicants. All in the initial group are pilot applicants.

"We are pleased with the quality of applicants," JSC Director Dr. Christopher C. Kraft Jr., said. "It is difficult to narrow the field for interviews and paring that number will be a real challenge."

Each group of applicants will spend about one week at JSC. Officials expect to complete the process by mid-November.

In December, NASA will select as many as 20 astronaut candidates in each of the two categories - pilot and mission specialist. The candidates will report to JSC in mid-1978 for two years of training and evaluation. Final selection as an astronaut will depend on satisfactory completion of the 2-year evaluation period.

The names, birthplaces (BP), high schools (HS), and current duty stations (DS) of the first 20 applicants selected for interviews are:

Maj. Gerald K. Bankus, 34, USAF; BP - Milan, Mo.; HS - Bossier City, La.; DS - Pentagon, Washington, D.C.

Lt. Richard E. Batdorf, 30, USN; BP - Wauseon, Ohio; HS - Bryan, Ohio; DS - NAS Patuxent River, Md.

Maj. John E. Blaha, 34, USAF; BP - San Antonio, Tex.; HS - Norfolk, Va.; DS - Pentagon, Washington, D.C.

Capt. Gary D. Bohn, 33, USAF; BP - Halstead Kan.; HS - Halstead, Kan.; DS - Tyndall AFB, Fla.

Capt. Claude M. Bolton, Jr., 31, USAF; BP - Sioux City, Iowa; HS - South Sioux City, Neb. DS - Edwards AFB, Calif.

Lt. Cmdr. Daniel C. Brandenstein, 34, USN; BP - Watertown, Wis.; HS - Watertown, Wis.; DS - Attack Squadron 145, FPO San Francisco, Calif.

Maj. Roy Bridges, Jr., 34, USAF; BP - Atlanta, Ga.; HS - Gainesville, Ga.; DS - Headquarters USAF/RDPN, Washington, D.C.

Maj. Frederick T. Bryan, 35, USMC; BP - Melrose, Mass.; HS - Watertown, Mass.; DS - Pacific Missile Test Center, Point Magu, Calif.

Capt. John Casper, 34, USAF; BP - Greenville, S.C.; HS - Chamblee, Ga.; DS - Edwards AFB, Calif.

Lt. Cmdr. Michael L. Coats, 31, USN; BP - Sacramento, Calif.; HS - Riverside, Calif.; DS - USN Post Graduate School, Monterey, Calif.

Maj. Stewart E. Cranston, 33, USAF; BP - Watertown, S.D.; HS - Rockledge, Fla.; DS - Tyndall AFB, Fla.

Lt. Cmdr. John O. Creighton, 34, USN; BP - Orange, Tex.; HS - Seattle, Wash.; DS - Fighter Squadron Two, FPO San Francisco, Calif.

Lt. Cmdr. William V. Cross II, 31, USN; BP - Omaha, Neb.; HS - Washing-



FREE FLIGHT CREW - The next time astronauts Gordon Fullerton, second from left, and Fred Haise, second from right, take this walk, they will be boarding the Orbiter Enterprise for its first solo flight test Aug. 12. The crew members are shown here prior to entering the spacecraft for the July 26 captive flight at Dryden Flight Research Center. At left is astronaut crew coordinator Rick Nygren. At right is suit technician Walt Salyer.

(Continued on page 4)

BIG CASH WINNER — Right: Harold T. Clayton (with check), aerospace engineering technician at the Space Shuttle Program Resident Office in Downey, Calif., receives a suggestion award of \$1,042 from William B. Wilson, resident manager. Clayton recommended utilizing a 72-bottle cart of argon rather than a 4-bottle cart, reducing changeover time at a savings of \$23,688.28 per Orbiter vehicle.



BOYS TO MEN — Below: 78 members of the U.S. Marine Corps Astronaut Platoon are sworn in July 20 in the Bldg. 1 auditorium. Administering the oath is Maj. Gen. Hugh Hardy, USMC Reserve. After a tour of the center, the new recruits headed for basic training in San Diego.



Estelle T. Herbert chosen top secretary

Estelle T. Herbert, secretary to the chief, Tracking & Communications Development Division, has been selected JSC Outstanding Secretary of the Month for July.

Herbert was nominated for the award by her supervisor, Ralph S. Sawyer. She received a plaque and \$100.

In his letter of recommendation, Sawyer said:

"Since Jan. 4, 1977, Mrs. Herbert has almost single-handedly performed all of the administrative support for the entire CCTV Source Evaluation Board which consists of approximately 46 evaluators.

"She has completed all typing on a daily basis and has never experienced any backlog.

"Estelle has performed essential duties as division secretary in Bldg. 44 early each morning prior to reporting to the Source Board Bldg.

"The Source Board evaluators are from various organizations throughout the center and many have served on other source boards of comparable size and complexity and have testified that it normally requires about three full-time secretaries to produce the documents she has done by herself.

"The entire Source Board is of the opinion that Mrs. Herbert has performed her administrative duties in an exemplary manner which such dedication and professionalism that she has earned their admiration and respect," Sawyer concluded.

Cafeteria Menu

WEEK OF AUGUST 8 - 12

MONDAY: French Onion Soup; Weiners & Macaroni; Round Steak w/hash browns; Meatballs & Spaghetti (Special); Okra & Tomatoes; Carrots. Selection of Salads, Sandwiches, & Pies Daily.

TUESDAY: Beef & Barley Soup; Shrimp Creole; Ground Pork Steak; Beef Stew; Fried Chicken (Special); Mixed Vegetables; Stewed Tomatoes; Buttered Rice.

WEDNESDAY: Seafood Gumbo; Fried Perch; New England Dinner; BBQ Plate; 8 oz T-Bone Steak; Shrimp Salad; Swiss Style Steak (Special); Italian Green Beans; Beets; Lima Beans.

THURSDAY: Cream of Chicken Soup; Turkey & Dressing; Enchiladas w/chili; Weiners & Beans; Stuffed Bell Pepper (Special); Zucchini Squash; Peas.

FRIDAY: Seafood Gumbo; Broiled Flounder; 1/4 Chicken w/peach half; Shrimp Salad; Salisbury Steak (Special); Shrimp & French Fries; Mixed Vegetables; Cabbage; Breaded Okra.

WEEK OF AUGUST 15 - 19

MONDAY: Chicken & Rice Soup; Texas Hots w/beans; BBQ Ham Steak; Veal Parmesan; Beef & Macaroni (Special); Spinach; Carrots; Au Gratin Potato. Selection of Salads, Sandwiches, & Pies Daily.

TUESDAY: Tomato Soup; Baked Chicken; BBQ Spare Ribs; Mexican Dinner (Special); Broccoli; Spanish Rice; Ranch Beans.

WEDNESDAY: Seafood Gumbo; Red Fish; Liver w/onions; BBQ Ham Steak; Shrimp Salad; Meatloaf (Special); BBQ Plate; Brussel Sprouts; Green Beans; Whipped Potatoes.

THURSDAY: Beef & Barley Soup; Chicken & Dumplings; Corned Beef w/cabbage; Smothered Steak (Special); Cauliflower; Cabbage; Parsley Potato.

FRIDAY: Seafood Gumbo; Pork Chop; Creole Baked Cod; Ham Steak; Seafood Platter; Salmon & Tuna Croquette (Special); Corn; Green Beans; Beets; Shrimp Salad.



Estelle T. Herbert

Excuses for not buying bonds

• I can't afford to save.

Can you afford not to: What do you do for ready cash when an emergency strikes? Everybody needs a rainy day fund — and the easiest way to build it is through the Payroll Bond Allotment Plan.

• There are too many deductions already.

Your payroll allotment isn't really a deduction. It's just a deferred payment that's always yours when you need it — plus interest!

• I have bills to pay.

The first bill you should pay is the one to yourself. This automatic plan makes sure your future gets a share of your pay check. (But if your immediate bill problem is that bad, start with just a minimum allotment and increase it later; or, delay the effective date for a month or so.)

• There must be better ways to save.

Maybe so. But is there one that's automatic; that guarantees a 6%

rate to maturity; that offers tax advantages; and that's backed up by the United States itself? This plan is the SUREST was to save ever invented!

• What is the minimum payroll deduction that I can set up?
\$3.75 per pay period.

• Who do I contact to sign up?
Roy C. Aldridge, campaign chairman, Bldg. 1, Rm. 152, or Charles E. Beckman, campaign coordinator, Bldg. 30, Rm. 2020.



PLOTTING THE FLIGHT — Astronaut Joe H. Engle, left, confers with Co-op student Kathy Forsyth in the ALT control room during the third captive active flight July 26. Forsyth was acting as assistant to Charles F. Deiterich, right,

flight dynamics officer. The two displays to Engle's left are scribing plotters which are radar-driven and show altitude and ground track of the 747/Orbiter.

Whoops!

The photo on page 4 of the July 22 *Roundup* showing thermal protection tiles on Orbiter 102 was printed upside down.

When under deadline pressure, the editor often finds himself unsure of which end is up.

Summer banquet set Aug. 19

Reservations are being taken until 4 p.m. Aug. 12 for the annual Summer Employees Banquet. The banquet will be held at 11:30 a.m. Aug. 19 at the Gilruth Recreation Facility.

Summer employees, including Summer Aids, VOE's, ICT's and Junior Co-ops, and their supervisors are invited. Also, since some of the aids, VOE's and ICT's will receive special performance awards, their parents are invited.

Cost of the luncheon is \$3.80 for roast beef or \$2.90 for baked chicken. Prepayment is required.

For information on making reservations, see the July 22 *Roundup* or contact Phonicille DeVore, Summer Aid coordinator, X-3734.

ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

The *Roundup* is an official publication of the National Aeronautics and Space Administration Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for JSC employees.

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Photographer: A. "Pat" Patnesky

First Voyager ready to launch on Aug. 20

NASA will launch two Voyager spacecraft this summer for an extensive examination of the outer planets.

Riding atop a Titan Centaur rocket, the Voyagers will be launched from Kennedy Space Center, Fla., on a decade-long odyssey that could take them to as many as 15 major celestial bodies.

These include giant Jupiter and ringed Saturn, several moons of both planets and possibly Uranus.

Making measurements and taking closeup pictures, the Voyagers will return information that could shed new light on the origin and early history of the solar system and our own planet Earth.

The first Voyager will be launched about Aug. 20. The second is scheduled for launch 12 days later, about Sept. 1.

Voyager 2 will be launched first and Voyager 1 second, as Voyager 1 will fly a faster trajectory than its companion and reach Jupiter in March 1979, four months ahead of Voyager 2. At Saturn encounter Voyager 1 will be about nine

months ahead of its sister craft.

At Jupiter the gravity-assist technique — using a planet's gravitational field to speed up a spacecraft and change its trajectory — will be used to send the Voyagers on to Saturn. With this "slingshot" technique Voyager 1 will arrive at Saturn in late summer of 1980, 3.2 years after launch.

Without using Jupiter's massive gravity, the flight from Earth would require 6.1 years. When it reaches Saturn, Voyager will have traveled 2.2 billion kilometers (1.4 billion miles) through space.

After completing their planetary missions, the two spacecraft will continue outward from the solar system and across the boundary of the wind of charged particles (solar wind) that streams outward from the Sun, thus penetrating into interstellar space.

The Voyager spacecraft are advanced versions of planetary explorers that have studied Mercury, Venus and Mars. The new craft weigh 825 kilograms (1,820 pounds).

EAA ATTRACTIONS

TICKETS

The following tickets are available at the Bldg. 11 Exchange Store from 10 a.m.—2 p.m. Monday — Friday.

Astroworld — Adult & children tickets available for \$6.95 each. That's a \$1 discount.

Dean Goss Dinner Theater — Comedy production, *Not with My Daughter*. Tickets \$16/couple available for any night except Monday, Saturday through Sept. 3.

Disney Magic Kingdom Club — Free membership cards.

Sea-Arama Marineworld — Tickets on sale, \$3.75 for adults, \$2.50 for children. Open until dusk, year round.

Six Flags — Adult & children tickets \$6.75 each. That's a \$1.20 discount.

JSC/BAY AREA RUN

JSC and the Bay Area Running Club will jointly sponsor a run Aug. 13 at the Gilruth Recreation Center. A 1-mile novice race and 4-mile event will be run.

Advance registration is requested

at \$1 per person. Registration on the day of the race will cost \$2. Registration forms are available at the center or from the club. They should be mailed to Dick Barton, Mail Code EX4.

Attempts are being made to have the race AAU recognized. Trophies will be awarded to top finishers in several categories.

DEFENSIVE DRIVING

The EAA will be offering its next defensive driving course Sept. 26-29 from 6-10 p.m. at the Gilruth Recreation Center.

Registration, still a long way off, is scheduled for Sept. 19-20 from 10:30 a.m. to 1:30 p.m. in the center lobby.

ALLEY THEATRE

The Alley Theatre Corporate Subscription program is again being offered to NASA and contractor employees. Season tickets are available for next year's five performances at a low price of \$19.95.

See your EAA representative for an Alley Theatre brochure which will explain the program. The bro-

chure contains an order form for subscriptions.

If you are planning to subscribe, fill out the form, enclose a check payable to Alley Theatre or indicate a charge plan on the form, and send to Cindy Kohrs, EG (X-4282).

Corporate Subscription coupon books will be mailed just prior to the opening of the 77-78 season in October. Deadline for placing orders under this special program is August 15, so don't delay.

SPORTS DEADLINE TODAY

Today, Aug. 5, is the last day to sign up for fall softball leagues and men's and women's volleyball. Games start the week of Aug. 15.

For information, call the Gilruth Recreation Facility, X-4921.

MIXED BOWLING

The NASA Mixed Bowling League needs couples, singles and five-member teams to join in the fun. The league bowls each Tuesday from 6-9 p.m.

Anyone interested in joining can contact Teresa Sullivan, X-2403, or John Frederick, X-4361.

Roundup Swap Shop

CARS & TRUCKS

71 Plym Spt Sub Sta Wgn. New radials, auto, pwr, dual air, cruise, tilt whl, rear seat, lugg rack, pwr bench front seat, trlr tow pkg, 440 V-8, xint cond. \$1,395. Bill, X-4207 or 333-3508.

72 MGB, needs handyman, \$1,550. 488-1846 or 481-5320.

71 Olds Custom Cruiser Wgn. Mech perf, needs paint. 481-1846 or 481-5320.

74 AMC Sportabout. Auto, air, radio, pwr steer, lugg rack, xint cond, 23K mi. \$2,750. 488-1544.

71 Buick Electra 225 Ltd. 4 dr, vinyl top, loaded, good cond. \$1,200. 482-1635.

76 Plym Volare. 4 dr, 6 cyl, air, auto, pwr, 11K mi. \$3,850. Ellis, X-3048 or 686-1923.

76 Granada. \$3,400. Handley, X-2271 or 482-7041.

71 Olds 98. All pwr, tilt whl, vinyl top, clean, 65K mi. \$2,200. Winkler, X-3343 or 482-4874.

Classy 74 Cadillac Coupe DeVille. All options incl quad stereo/8 tr tape, velour int, xint cond, 49K mi. \$4,750. Walker, X-4488 or 479-7815 after 6.

69 Dodge Charger Spec Edit. V-8, auto, air, pwr, 1 owner, xint cond. \$1,500. Pruett, X-4491 or 487-4914 after 5.

57 Chevy Belair. 4 dr sedan, xint cond. \$895. 485-5288 after 6.

69 Chevy PU. 307, std, shell camper, runs good. \$900. 471-2262 after 5.

CYCLES

74 Honda 450. Full dressed incl Harley rear whl, xint cond, 13K mi, must sell. Terri, X-2291 or 641-1120 evngs.

Honda 350-4, \$300 or best offer. Yamaha 100, needs work, make offer. Shrlley, 659-3118.

RECREATIONAL VEHICLES

75 Cobra Mini-motorhome. 22', loaded, xint cond. Financed w/JSC Cred Un. 488-3170 or 488-3377 after 5.

28' 1972 Silver Streak travel trailer. 6K mi, very good cond. \$7,950. Pittman, X-5026 or 488-1243 after 5.

Camping trailer, tent type. Camel "Dunes" Model sleeps max of 6, w/screened patio, good cond. Highest offer. Handley, 482-7041.

PROPERTY & RENTALS

Lease: Sagemont, 3-2-2D. Fenced, draped, wet bar, shag in den w/firepl, 1800 sq ft, spotless. \$435 & dep & references. 943-1752.

Galveston West End. 2 BR By-the-Sea condo apt, full furn. \$180/wk off season, \$260/wk in season. Clements, 474-2622.

Must sell 2 lots: One on Lake Somerville (Birch Creek Forest), wooded, next

Swap Shop advertising is open to JSC federal and on-site contractor employees. Goods or services must be offered as advertised, without regard to race, religion, sex or national origin. Non-commercial personal ads should be 20 words or less, and include home telephone number. Typed or scribbled ad copy must be received by AP3/Roundup by Thursday of the week prior to publication.

to small lake, boating access to Somerville, rec facils. One wooded 1-acre at Beaver Creek, on undev prop 9 mi from Lake Somerville. D. Schmidt, X-4063 or 333-4379.

Sale: Lg wooded lot in Big Thicket area (near Rye). Private fishing lake. Leach, X-3584 or 474-3386.

Lease: Friendswood (Wedgewood) 4-2-2 plus screened patio, \$380/mo. Speller, X-2926 or 482-6651 after 5.

Lease: New 3-2-2, Sagemont area (Wood Meadow). Firepl, etc. \$395/mo. 334-3202 after 5.

Rent: Heritage Pk. Beaut 3-2-2 only 2 mo. old. Lg Country kitchen, 1633 sq ft. \$400/mo. 332-3204.

Sale: Islander East Condo, top floor efficiency. Xint Gulf view, balcony, tennis, beach, swim pool, furnished. 481-3397 after 6.

Reserve for vacation now. Jamaica Beach, Galveston. New 2 story. \$175/wk, 334-1640 after 5.

MUSICAL INSTRUMENTS

Piano. Spinnet, xint cond except for tuning. \$150. Taylor, X-5454 or 944-5818.

Ovation 12-string Guitar. Mint cond. 488-2613.

La Blanc, Normandy clarinet. Used only 18 mos, ideal for beginner, school approved. \$150. 474-2906.

CAMERAS & TELEVISIONS

Konica 35mm f3.2 Auto Hexanon wideangle lens for Autoreflex T or TC cameras, \$60. Also 2X teleconverter for same camera, \$15. Patterson 8X10 print washer, new, \$25. Pruett, X-4491 or 487-4914 after 5.

Console color TV. 23" diag. \$150. La Pine, X-3209 or 944-2752.

HOUSEHOLD ARTICLES

4 Early Amer dk walnut chairs, \$60. Turquoise draperies, floor length for 6' window, hdware, \$35. Gym set w/elec massage board, \$40. 488-0010 after 5:30.

Ethan Allen buffet w/hutch, hardrock maple. \$250. Richards, 488-5546.

2 oiled walnut end tables, \$15 ea; 1 oiled walnut corner table, \$25; all 3, \$50. 1 modern lt oak dubl bed w/matt, box spgs, \$50. Green tole floor lamp, \$10. Wardell, X-3958 or 333-3587.

Sterling silver, Strassburg by Gorham. Knife & fork, dinner size, rest all serving size. 35% off. Burdsal, X-3091 or 482-2873.

Early Amer bedroom suite; bunk or

twin beds bachelor chest & desk. 488-2613.

MISCELLANEOUS

King KX-160 Nav/Com. Recently recertified on all channels. \$450. Pruett, X-4491 or 487-4914 after 5.

Labrador Retriever pups. A few left, AKC reg. 446-2442 or Chris, X-6293 betw 7 & 5.

Air cond compressor, evaporator & plumbing for small foreign cars. \$25. Jacobs, X-2254.

Mint US &/or world stamp collections. 50-60% below catalog value. Reasonable offer. Sugano, X-3856 or 482-5393.

Belgium Browning shotgun collection. Ruger, Colt, S&W, Mauser Pistols. Betw whlsale & retail. 481-5320 or 488-1846.

New solid front door for house, \$45. New hollow core interior door, \$7. 333-3690 after 5:30.

2 black bucket seats for Dodge van.

Xint for boat good as new. \$60. Ferguson, X-3721 or 482-3241.

Pool table, Sears 4X8 w/balls, racks, cues, etc; \$100. Also Sears 7HP riding lawnmower, \$100. 332-3204.

Pool table. 6' Sears Holiday, balls & sticks, good cond. \$25. Biggs, 471-2745.

New Pace Mobile/Base CB, \$85. New ase antenna, \$40. 488-1846.

LATE ENTRIES

71 Honda 350, good cond, \$395. 66 Triumph, Blk w/white cover, runs good, \$325. 334-2003.

Vacation retreat for rent, Cape Royale on Lake Livingston. Tennis, pool, boat launch, golf. By wk or mo. 488-3746.

Lawson sofa. \$30. Hervig, 488-3618.

77 Ford Granada. 2 dr sedan, almost new, AM/FM stereo, air, mag whls, 1/2 vinyl top. Assume notes w/very low equity. Will consider offer. Chambers, X-4902 or 747-0940 after 6.

WANTED

Need conscientious male to share furnished house 5 mi from JSC. No lease, \$130/mo. Sugano, X-3856 or 482-5393 after 5.

Want shop manual for 75 Pinto Sedan. Doug, X-3561 or 538-2367.

Want ride to/from work at Bldg 37 from Heritage Pk subdvi, 7:30-4:30. Will share expenses. Brad, X-554.

Need riders for carpool from W. Loop, SW Fwy, Bellaire area, 8-4:30. McLaughlan, X-5536 or 661-2974.

JSC Crossword

(See answers, page 4)

ACROSS

- Electromagnetic Interference (acronym)
- Constantly
- Calif. wine-producing area
- North Carolina (abbr.)
- He loved Lucy
- And others; ___ al
- Spaceplane
- Electroluminescent (acronym)
- Not affirmative
- Arc measure
- Subjective "us"
- Vigor, zest
- Pulse Frequency (acronym)
- Ascended
- Tidy
- He's on first

DOWN

- Conclusion
- Actress ___ West
- By the fact (Latin); ___ facto
- Typical JSC employee
- Roman 95
- Braking rocket

1	2	3			4	5		6
7			8		9			
10							11	
		12						
13	14							15
16						17		
18						19		20
		22				23		
24							25	

- Flying machine
- Even
- Aldrin's given name
- Shelter

- Dilatory
- Charcoal
- New (prefix)
- Ma's husband

Landsat program marks fifth anniversary

Landsat 1, the first satellite ever launched to focus specifically on the Earth and its natural resources, completed its fifth year in orbit last month.

Launched July 23, 1972 — with a life expectancy of only one year — Landsat 1 carries devices which record and transmit to Earth the unique signatures radiated by land, water, minerals, vegetation and man-made structures.

Landsat 1 was joined by a second satellite, Landsat 2, Jan. 22, 1975. Weighing 816 kilograms (1,800 pounds) and circling 925 kilometers (575 miles) above the Earth in polar orbit, each satellite photographs three strips of North America 185 km (115 mi.) wide and 11 similar strips covering the rest of the world.

Strips photographed the following day are contiguous to those of the first day, with a 14 per cent overlap of coverage at the equator and a greater overlap near the poles.

With each satellite 180 degrees apart, coverage of a given spot on the Earth is repeated every nine days. It is this repetitive coverage that provides Landsat with the ability for monitoring time-dependent changes in surface features.

In early 1978, the system will be joined by a third satellite, Landsat 3. Landsats are built by the Space Division of General Electric Co., Valley Forge, Pa.

No satellite has stirred more excitement than Landsat. The late space pioneer, Dr. Wernher von Braun, predicted that through this one program alone, the nation

could realize "a return exceeding its total space program investment."

Using the signatures and other data collected by the satellite, scientists have achieved some dramatic applications.

Landsat imagery has provided the raw data to identify the polluters of air and water. It has led geologists on oil and mineral hunts in Alaska, Oklahoma, the Rocky Mountains and the jungles of Brazil.

Biologists have been able to detect potential fishing grounds. Changes in ecology brought on by forest fires, earthquakes and strip mining have been plotted.

Urban development is guided by determining in advance how projected growth patterns will affect transportation needs, public service facilities and the environment.

Landsat's potential for agriculture is staggering. Farmland of an entire region can be sorted crop by crop in a matter of hours in combination with high speed computers. The end result is a computer-printed terrain map showing precise location and area of each crop with an accuracy of more than 90 per cent.

Investigators using Landsat images of California's Imperial Valley, for instance, inventoried in 40 man-hours more than 25 separate crops in 8,865 fields. The total area covered was 185,150 hectares (458,000 acres).

Among the crops readily identified were corn, popcorn, soybeans, sorghum, oats, grasses (rye, Bermuda, Alicia and Sudan), lettuce, mustard, tomatoes, carrots, onions and alfalfa.

The scientists distinguished between wet-planted fields, plowed lands, harvested fields and bare soil in areas as small as 4.5 hectares (10 acres). The remote sensing devices on a Landsat scheduled for launch in the early 1980s will locate and identify these characteristics on a one-acre plot.

This experiment demonstrated the potential of a satellite system to conduct extensive and repeated crop surveys which could increase accuracy and timeliness of forecasting harvest volume and contribute to decisions on new plantings to meet demands.

One such system using Landsat satellites is the Large Area Crop Inventory Experiment (LACIE), a three-year project involving NASA, the U.S. Department of Agriculture and the National Oceanic and Atmospheric Administration.

Designed to improve the accuracy of global crop forecasts, LACIE, in its initial states, is aimed at forecasting wheat crops. It can, however, be expanded at a later date to include other major grains such as rice and corn.

The first full crop year of LACIE has been completed as planned, and with the final successful completion of this major experiment, the United States will have demonstrated the technology required for an operational global crop forecasting system of paramount international political and economic significance.

To date the oil and mining industries are the largest purchasers of Landsat data which are made available through the U.S. Department of the Interior's EROS Data Center at Sioux Falls, S. D. Although the Landsat data use tech-

niques are still experimental, there have been some notable successes locating new mineral deposits with the help of these images and tapes.

Landsat images completely free of clouds are now available for every part of the United States. A large scale mosaic covering several western states has revealed some previously unrecognized details of an east-west fault associated with the Colorado mineral belt.

Known mineral locations corresponding with those deduced from Landsat data have thus indicated the possibility of new and untapped lineaments revealing similar areas to be explored.

Accurate predictions of snow-melt are important in planning the best use of water for power generation, irrigation, flood control planning and estimating future water supplies for major cities.

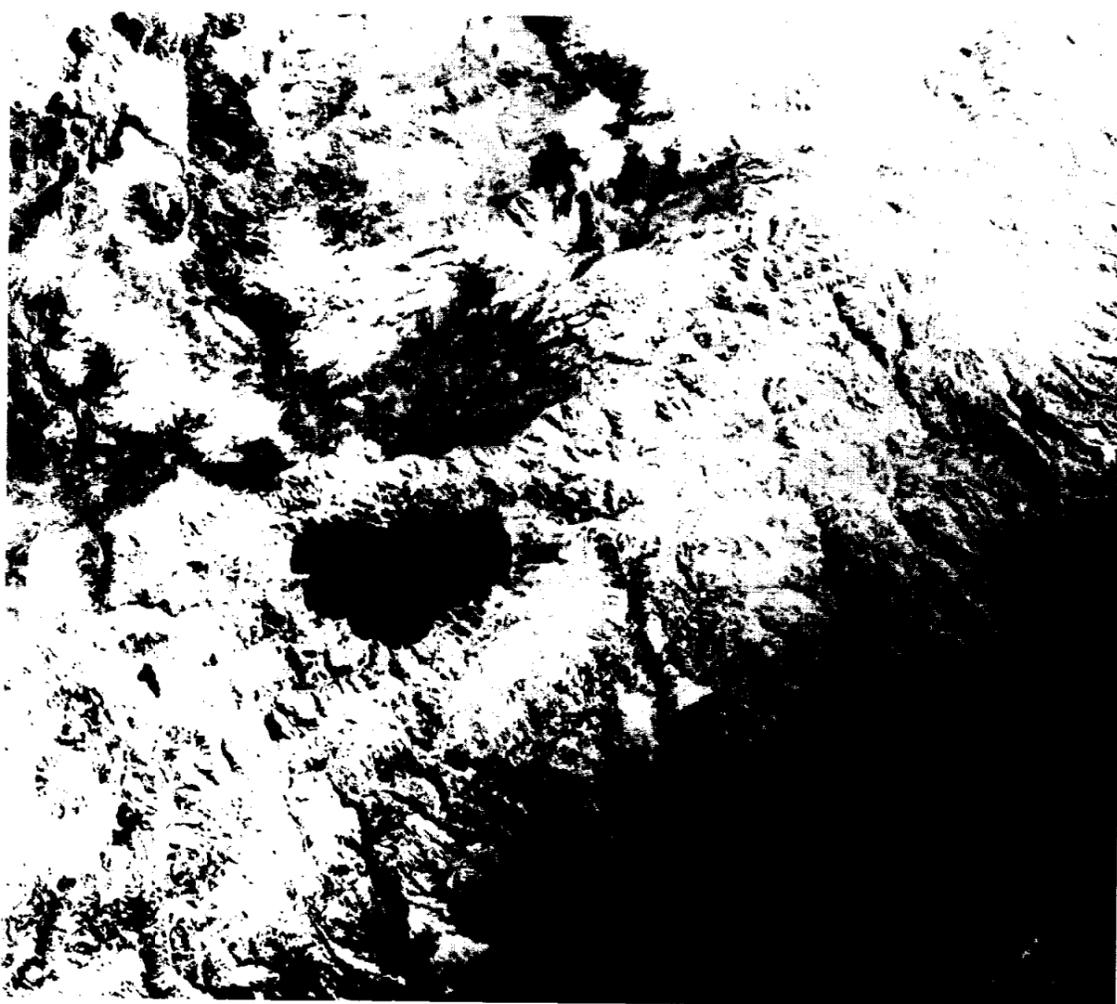
Up to now, such predictions — useful in deciding whether to hold or release water in reservoirs — have been based on less accurate observations made by foot or land vehicle penetration of remote wilderness areas or by aircraft (see photo).

NASA is working with other federal agencies and several states in analyzing the data gathered by Landsat and weather satellites for predicting the amount of water to be expected from melting snow in mountain areas.

Landsat data are also being used in a cooperative effort to assess the marine environment in a 3.87 billion square meter (4.63 billion square yard) area of the Gulf of Mexico.

In combination with ground information gathered by a commercial fishing fleet of some 70 vessels, three oceanographic research ships, a low-flying "spotter" group of nearly 40 airplanes, four marine oil drilling rigs and a weather satellite, Landsat images have been used successfully to locate and harvest living marine resources in the Gulf.

But even with all these applications it is obvious that the potential of Landsat has just barely begun to be tapped.



SIERRA NEVADAS BY SATELLITE — This Landsat image of the snow-laden Sierra Nevada Mountains, covering a 13,225 square mile area, depicts a near normal snowpack on Feb. 23, 1975. Measurements made from this image reveal

that the snowline is 2,000 feet lower than the snowline in a comparable 1977 Landsat image. At the center of the photograph is Lake Tahoe.

U.S., Soviets planning comparison tests in Wallops Island area

NASA and the Soviet Hydromet Service are planning to conduct a two-week long rocketsonde inter-comparison test in the area of Wallops Island, Va., in mid-August.

NASA will launch its rockets from NASA's Wallops Flight Center and the Soviet Hydromet Service will launch its rockets from the "Akademik Korolev," a hydrometeorological research ship located in international waters off the United States' eastern coast. The ship is expected to arrive about Aug. 7.

This intercomparison is to establish a basis for relating U.S. and Soviet measurements of upper air temperature and winds taken by meteorological instruments in their respective rocketsonde systems and to suggest possible corrections for

any discrepancies found.

The 1971 NASA-Soviet Academy of Sciences agreement on space science and applications called for exchange of meteorological rocket data from several launch sites along two meridian lines, one in the Eastern Hemisphere (about 60 degrees East) and one in the Western Hemisphere (about 70 degrees West).

This Eastern Hemisphere network is coordinated by the U.S.S.R. Hydrometeorological Service (on behalf of the Soviet Academy) and the Western Hemisphere network is coordinated by NASA.

Exchange of rocketsonde data began in January 1972 and both sides began performing hemispheric analyses with that information.

These analyses revealed that the measured temperature field in the Eastern Hemisphere was consistently colder than that of the Western Hemisphere. As a result of this discrepancy, both countries began evaluating their rocketsonde systems for possible sources of error.

In 1973 direct comparisons of the U.S., U.S.S.R., French and British rocketsondes were conducted at Kourou, French Guiana. These comparisons revealed some discrepancies in measurements of temperature and wind data.

Since the 1973 comparisons, improvements in meteorological rocket systems and data analysis techniques make it necessary again to compare the U.S. and U.S.S.R. systems.

Astronaut applicants...

(Continued from page 1)

ton, D.C.; DS — USS Nimitz, Norfolk, Va.

Capt. Edward L. Daniel, 32, USAF; BP — Eagle Pass, Tex.; HS — Alexandria, Va.; DS — Edwards AFB, Calif.

Capt. Michael E. Durbin, 35, USAF; BP — Dallas, Tex.; HS — Dallas, Tex.; DS — 36th Tactical Fighter Wing, Bitburg, Germany.

Lt. James O. Ellis, Jr. 30, USN; BP — Spartanburg, S.C.; HS — Marietta, Ga.; DS — NAS Patuxent River, Md.

James D. Erickson, 35, civilian; BP — Spokane, Wash.; HS — Veradale, Wash.; DS — Federal Aviation Administration, Ft. Worth, Tex.

Lt. Cmdr. Kent H. Ewing, 34, USN; BP — San Angelo, Tex.; HS — College Park, Ga.; DS — NAS Cecil Field, Fla.

Capt. Guy S. Gardner, 29, USAF; BP — Altavista, Va.; HS — Alexandria, Va.; DS — Edwards AFB, Calif.

Capt. Thomas E. Fitzpatrick, 32, USMC; Winter Haven, Fla.; HS — Haines City, Fla.; DS — Naval Air Test Center, Patuxent River, Md.

JSCrossword answers

(See puzzle, page 3)

O	H	M		T	H	E	N
E	S	A	O	P	P		I
N	A	L	E	A	M		W
	S	E	R	E	G	E	D
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R	E	I	T	B	O	R	I
			G	I	S	E	D
E		N		H	P	H	N
R	E			I			E